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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/931,469	08/16/2001	Rajiv Laroia	Flarion-21	2998

26479 7590 02/05/2007  
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EXAMINER
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NGUYEN, STEVEN H D

ART UNIT	PAPER NUMBER
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2616

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/05/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

09/931,469

Applicant(s)

LAROIA ET AL.

Examiner

Steven HD Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 10, 14-15, 20-27 and 30-37 are rejected under 35 U.S.C. 102(b) as being anticipated by Shattil (WO 9941871).

Regarding claims 1 and 36-37, Shattil discloses a method of processing a frequency division multiplexed signal being OFDM (page 4, line 31-34) representing a plurality of symbols and including a plurality of tones, a first subset of said plurality of tones being allocated to a first user (page 7, lines 27-29 and page 12, lines 23-28) comprising the steps of performing a time domain to frequency domain transform operation on the frequency division multiplexed signal to generate a frequency domain signal there from (page 7, lines 4-6); filtering the frequency domain signal to remove tones that allocated to a second users in said plurality of tones which are not included in said first subset of tones that allocated to the first user (Fig 7, Ref 56 is a filter); performing a frequency domain to time domain transform operation on the filtered frequency domain signal to generate a filtered time domain signal (Fig 4, page 6, lines 1-10, page 12, lines 12-14) and recovering symbols transmitted to the first user from the filtered time domain signal (Fig 7, Ref 66, page 7, lines 10-13 and page 12, lines 12-14).

Regarding claim 2, Shattil discloses performing a channel equalization operation on the filtered time domain signal (page 7, lines 6-13, page 8, line 30-40 and Fig 7).

Regarding claims 10 and 27, Shattil discloses the frequency division multiplexed signal is an orthogonal frequency division multiplexed signal (page 4, lines 31-34); recovering symbols transmitted to the first user includes mapping values of the filtered time domain signal at instants in time used to transmit symbol values to values in a set of symbol values (Fig 7, Page 7, lines 3-23 adapted to estimate information symbols impressed on received pulses which are centered at equally spaced instants in time used to transmitted symbol values).

Regarding claims 14, Shattil discloses an apparatus for processing a frequency division multiplexed signal representing a plurality of symbols and including a plurality tones, a first subset of said plurality of tones being allocated to a first user (Page 7, lines 27-29 and page 12, lines 23-28), the apparatus comprising a time to frequency domain transform module for generating a frequency domain signal from the frequency division multiplexed signal (page 7, lines 4-6); a tone filter (Fig 7, Ref 56) for filtering from the frequency domain signal generated by the time domain to frequency domain transform module tones other than those included in the first subset to thereby generate a filtered frequency domain signal; a frequency to time domain transform module (Fig 4, page 6, lines 1-10, page 12, lines 12-14) for performing a frequency domain to time domain transform operation on the filtered frequency domain signal to thereby generate a time domain signal; a time instant to symbol mapping module coupled to the frequency to time domain transform module for mapping signal values at points in time to symbol values (Fig 7, Ref 60mn, 64m, 66, page 7, lines 8-13, page 12, lines 12-14, page 15, lines 12-16).

Regarding claim 15, Shattil discloses a channel equalization module coupling said frequency to time domain transform module to the time instant to symbol mapping module, the channel equalization module performing channel equalization operations on said time domain signal (page 7, lines 6-13, page 8, line 30-40 and Fig 7).).

Regarding claims 20 and 22, Shattil discloses a method of processing a received orthogonal frequency division multiplexed signal to generate symbol values (Page 4, lines 31-34), the method comprising performing a channel equalization operation on the received OFDM signal in the time domain (Page 7, line 6-7); and mapping values of the OFDM signal after channel equalization at instants in time used to transmit symbol values to symbol values (Fig 4, 12b and page 7, lines 8-13).

Regarding claim 21, Shattil discloses filtering (Page 6, lines 4-6, Fig 7, Ref 56) the OFDM signal in the frequency domain to remove undesired signal tones on the received signal in the time domain prior to performing said channel equalization operation (Page 7, lines 27-29),

Regarding claim 23, Shattil discloses a time to frequency domain transformer (Page 7, lines 4-6, tone filter (Fig 7, Ref 56) for filtering the received OFDM signal in the frequency domain and frequency to time domain transformer for transforming the filtered OFDM signal in time domain to frequency domain (Page 6, lines 1-10 and page 12, lines 12-14) and channel equalization (page 7, lines 6-13, page 8, line 30-40 and Fig 7).

Regarding claim 24, Shattil discloses a communications system comprising an orthogonal frequency division multiplexed signal transmitter (Fig 1 and 2, page 4, line 31-34) including a symbol to time instant mapping module (page 4, line 25 to page 6, line 12 and page 12, line 3-28) for mapping a plurality of symbols to be transmitted to uniformly spaced points in time

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within a time period corresponding to a symbol duration; and an orthogonal frequency division multiplexed signal receiver (Fig 7) including: a time instant to symbol mapping module (page 7, lines 3-14) for mapping signal values at points in time used to transmit symbols to symbol values.

Regarding claim 25, Shattil discloses a time to frequency domain transformer (Page 7, lines 4-6, tone filter (Fig 7, Ref 56) for filtering the received OFDM signal in the frequency domain and frequency to time domain transformer for transforming the filtered OFDM signal in time domain to frequency domain (Page 6, lines 1-10 and page 12, lines 12-14)

Regarding claim 26, Shattil discloses a time domain channel circuit (page 7, lines 6-13, page 8, line 30-40 and Fig 7).

Regarding claims 30 and 34-35, Shattil discloses recovering multiple symbol values from the filtered time domain signal includes recovering a plurality of symbol values from a portion of said filtered time domain signal corresponding to a single OFDM symbol transmission time period, each symbol value corresponding to a different point in time within the single OFDM symbol transmission time period (page 7, lines 10-13 and page 12, lines 12-14).

Regarding claim 31, Shattil discloses different points in time within the symbol transmission time period from which individual symbol values are generated are uniformly spaced in time within the single OFDM symbol transmission time period (Fig 7, Ref 66, page 7, lines 10-13 and page 12, lines 12-14).

Regarding claim 32, Shattil discloses time instant to symbol mapping module is a time domain signal processing module which maps each one of multiple individual time instants within an OFDM symbol time period to corresponding individual symbol values according to a

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one to one relationship between time instants and symbol values (Fig 7, Ref 66, page 7, lines 10-13 and page 12, lines 12-14).

Regarding claim 33, Shattil discloses mapping of values of the OFDM signal after channel equalization involves performing said mapping of values in the time domain, said mapping including mapping of a plurality of individual instants in time within an OFDM symbol period to generate a corresponding plurality of symbol values, each of the plurality of symbol values corresponding to a single time instant (Fig 4, 12B and page 7, lines 8-13).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3-9, 11-13, 16-19 and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shattil in view Blanchard (USP 5612978).

Regarding claims 3-9, Shattil fails to disclose recovering symbols further includes performing a channel estimation operation, said channel estimation operation including identifying a training symbol in the filtered time domain signal; generating at least one channel estimation as a function of the difference between the identified training symbol and a known training symbol value; each dwell includes training symbols which is located in the middle of dwell and performing equalization without midamble. However, the examiner takes an official notice that a method and system for estimating channel characteristic based on the different

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between known; identified training symbol and each dwell includes training symbols which is located in the middle of dwell and performing equalization without midamble are well known and expected in the art at the time of invention was made in order to implement this method into the teaching of Shattil. The motivation would have been to provide a quality signal by reducing the interference.

Regarding claims 11 and 28, Shattil fails to disclose recovering symbols transmitted to the first user further includes performing a symbol value to symbol value mapping operation to map symbol values generated by mapping values of the filtered time domain signal to values in another set of symbol values. However, the examiner takes an official notice that a method and system for performing a symbol value to symbol value mapping operation to map symbol values generated by mapping values of the filtered time domain signal to values in another set of symbol values is well known and expected in the art at the time of invention was made in order to implement this method into the teaching of Shattil. The motivation would have been to obtain a quality level by performing mapping between modulated symbol levels with symbol values.

Regarding claims 12, Shattil fails to disclose performing a time domain to frequency domain transform operation includes performing one of a Fast Fourier Transform operation and a Discrete Fourier Transform operation; performing a frequency domain to time domain transform operation includes performing one of an Inverse Fast Fourier Transform operation and an Inverse Discrete Cosine Transform operation. However, Shattil fails to disclose a receiver, which includes FFT and IFFT. In the same field of endeavor, Blanchard discloses a receiver includes a FFT, filter and IFFT (Fig 1, Ref 24).



Since, FFT and IFFT are well known in the art for using to transform time to frequency and frequency to time. Therefore, it would have been obvious to one of ordinary skill in the art to implement FFT and IFFT into the teaching of Shattil and Vijayan. The motivation would have been to obtain a quality signal.

Regarding claim 13, Shattil discloses receiving FDM signals corresponding to users other than first user (Page 7, lines 27-29, page 8, lines 20-25, page 12, lines 3-14 and 23-28).

Regarding claims 16-18, Shattil fails to fully disclose a channel estimation circuit coupled to said frequency to time domain transform module and to the channel equalization module for generating at least one channel estimate from the time domain signal and for supplying the channel estimate to the channel equalization module, a symbol to symbol mapping module and a cyclic prefix discarding circuit coupled to the time to frequency domain transform module for discarding portions of the frequency division multiplexed signal corresponding to cyclic prefixes. However, the examiner takes an official notices that a channel estimation, a symbol to symbol mapping module a cyclic prefix discarding circuit are well known and expected in the art at the time of invention was made to implement a channel estimation circuit and a symbol to symbol mapping module into the teaching of Shattil. The motivation would have been to provide a quality signal by reducing the interference.

Regarding claim 19, Shattil fails to discloses the time to frequency domain transform module is a Fast Fourier Transform circuit; and wherein the frequency to time domain transform module is an inverse Fast Fourier Transform circuit. In the same field of endeavor, Blanchard discloses a receiver includes a FFT, filter and IFFT (Fig 1, Ref 24).

Since, FFT and IFFT are well known in the art for using to transform time to frequency and frequency to time. Therefore, it would have been obvious to one of ordinary skill in the art to implement FFT and IFFT as disclosed by Blanchard into the teaching of Shattil. The motivation would have been to obtain a quality signal.

Regarding claim 28, Shattil discloses the value of the filtered time domain signal at a single instant in time is used to generate one symbol value (page 7, lines 8-10 and page 15, lines 12-16).

### ***Response to Arguments***

5. Applicant's arguments filed 11/16/06 have been fully considered but they are not persuasive.

In response to pages 18-23, the applicant states Shattil fails to disclose a filter for removing carriers or tones according to the claim. In reply, Shattil's filter removes the tones or carriers that does not belong to a user in a frequency domain and performing time to frequency (Page 7, lines 3-13).

In response to page 24-25, the applicant states that Shattil fails to disclose the claimed invention as stated in the office action.

In response to page 26, the applicant states that Shattil fails to disclose a symbol to time mapping module. In reply Shattil discloses it symbol to time instant mapping module (page 4, line 25 to page 6, line 12 and page 12, line 3-28).

### ***Conclusion***

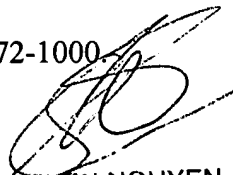
6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven HD Nguyen whose telephone number is (571) 272-3159. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wellington Chin can be reached on (571) 272-3134. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
STEVEN NGUYEN  
PRIMARY EXAMINER